

ATLANTA REGIONAL MANAGED LANE SYSTEM PLAN

GDOT TOLLING & TRAFFIC AND REVENUE PRIMER

PREPARED FOR

Georgia Department of Transportation
Office of Planning
600 West Peachtree Street NW
Atlanta, GA 30308
Phone: (404) 631-1796
Fax: (404) 631-1804
Contact: Michelle Caldwell

PREPARED BY

HNTB Corporation
3715 Northside Parkway
400 Northcreek, Suite 600
Atlanta, GA 30327
Phone: (404) 946-5708
Fax: (404) 841-2820
Contact: Andrew C. Smith, AICP

Atlanta Regional Managed Lane System Plan

Technical Memorandum 6: GDOT Tolling & Traffic and Revenue Primer

Prepared for:

Georgia Department of Transportation

One Georgia Center, Suite 2700

600 West Peachtree Street NW

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Foreword

This Primer provides a concise discussion of the principles of tolling and traffic and revenue studies. The purpose of this effort is to produce a document that can be widely distributed within and external to the Department to foster a better understanding of tolling & traffic and revenue practices. It is the intent of this document to provide a thorough overview without going into a level of detail that can confuse readers and cause them to disengage from the subject matter. The Primer content also pivots off feedback from the tolling and traffic and revenue studies currently and previously conducted by HNTB with key Department staff as part of the Public-Private Initiative educational efforts.



“Tolling is shaping up as one of the biggest philosophical changes in transportation policy since the toll-free Interstate highway system was created under President Dwight D. Eisenhower in 1956.”

New York Times 4/28/2005

This Primer overviews several key issues in the roadway tolling and private financing realm. It provides a short history of tolling in the United States, an overview of the objectives of tolling, different forms of tolling used, a description of different types of traffic and revenue studies, toll financing mechanisms and tolling policy.

I. Tolling Overview

History of Tolling

Tolling was used to finance infrastructure in the United States as early as the 18th century. The first major toll road, or turnpike, in the United States was the Lancaster Turnpike, which was built in 1795 and ran from Philadelphia to Lancaster, Pennsylvania. Toll financed infrastructure gained momentum in the mid 20th century with the advent of automobiles. The Pennsylvania Turnpike, built in the 1930s, is an example of this. Such Turnpikes were designed for efficient intercity movements and were usually financed through bonds backed through future toll revenues. Several other toll roads, modeled after the Pennsylvania Turnpike, were also constructed. These included the Indiana Toll Road, Massachusetts Turnpike, Ohio Turnpike and the New Jersey Turnpike.

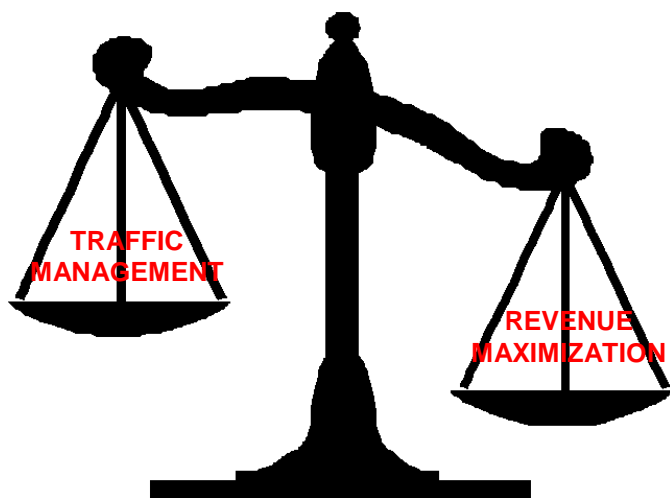
The construction of the Interstate System, which began in 1956, created a system of publicly funded highways and consequently reduced the interest in privately funded roads. With the introduction of Electronic Toll Collection in the 1990's, the delay associated with toll booths was reduced and new concepts such as Managed Lanes or High Occupancy Toll lanes became feasible. Currently, tolling represents an important revenue source to fund not only new roadways but also the maintenance and upkeep of existing facilities.

Why tolling?

In light of growing transportation needs and limited funding for transportation projects, tolling of transportation facilities has emerged as a viable option for state and local governments to fund transportation projects. Improvements to the operational characteristics of the transportation system can also be achieved through the introduction of dynamic tolling options such as managed lanes.

However, the type of tolling model often determines which of these objectives is applicable or takes precedence while determining toll policy. At one end is the traditional toll road where users pay a flat rate, either at toll booths or electronically, for the use of a facility. This model primarily focuses on revenue generation and provides limited traffic management options. At the other end are sophisticated models such as managed lanes where the toll rates are electronically charged and are adjusted according to the level of congestion on the lanes. One of the primary goals of a managed lane is to provide a reliable travel time to users and thus, traffic management is a key consideration in managed lanes policy.

Figure 1: Tolling Objectives – A Balancing Act



The choice of the tolling models determines the benefits that tolling a facility can offer. The two major benefits of transportation facility tolling – revenue generation and optimizing traffic flow relate to the two “book-end” pricing or tolling objectives that are often used as policy drivers in tolling studies. These two benefits are discussed below.

- **Traffic Management** – The traffic management scenario is an exercise in transportation efficiency. The objective of this concept is to maximize the travel efficiency on the tolled system without unnecessarily diverting traffic to alternative roadways. This concept in essence maximizes the efficiency of the transportation network. The following elements characterize a traffic management policy:
 - Peak-period vehicle traffic is usually less in priced lanes as opposed to general purpose lanes.
 - Variable or dynamic pricing which varies by peak period demand is a key element of such a tolling strategy.
 - Some diversion to other routes, times or modes may occur and may be desirable for traffic management purposes.
- **Revenue Maximization** – A revenue maximization scenario strives to capture as much revenue as possible through a higher, more variable toll structure in order to maximize the financial capacity of the project. The following elements characterize a revenue maximization policy:
 - Toll rates are set at a level that generates the maximum amount of revenue.
 - Revenues are often dedicated to the maintenance and debt payment of the tolled facility or directed to other roadway projects typically in the same corridor.
 - Higher toll rates may cause users to shift to other routes or modes.

There is a high degree of sensitivity and compromise between the two scenarios described above. Generally, lower toll rates means higher usage of tolled facilities and thus, reduced operational benefits.

Tolling Forms

Bridges and roadway facilities can be tolled in several different ways. With the advent of new technology such as Electronic Toll Collection (ETC), more efficient forms of tolling, such as managed lanes operations, are now possible. Some of the main tolling forms are listed below:

- **Toll Roads** – This is the simplest tolling scenario where a toll is charged at one or multiple points along a facility. All roadway users are required to pay the toll in exchange for the use of the tolled section of the facility. The toll may be collected at a toll booth or electronically through a transponder.

Figure 2: GA 400 Toll Plaza, Georgia



- **Managed Lanes (HOT, ETL¹, TOT² – premium price for travel time savings and reliability)** – The number of vehicles in managed lanes is controlled through variable pricing so that free-flow traffic is maintained in the lanes at all times, even during peak periods. Thus, managed lanes offer the opportunity to effectively blend operational needs of all roadway users, SOVs, HOVs and transit into a comprehensive management system that continuously measures and adjusts conditions in the corridor to improve mobility and keep traffic flowing. Additionally, managed lanes can also accommodate trucks as demonstrated in San Diego. While the usage of managed lanes by trucks is not inherent to the lane management principle, there are currently several studies underway which incorporate this concept. The dynamic control of cost for using managed lanes is essential to controlling the demand for the

¹ ETL means that all vehicles in the managed lanes pay a toll. Trucks are not permitted in the managed lanes.

² TOT means the managed lanes are reserved for trucks willing to pay a toll.

facility thereby continually ensuring a high level of service and guaranteed mobility in the managed lanes. The cost of premium transportation service (low congestion levels and guaranteed mobility) would vary by the congestion level in the managed lanes. Lane management options can include a combination of High Occupancy Toll (HOT) lanes and Truck Only Toll (TOT) lanes or Express Toll Lanes (ETL).

Figure 3: I-15 Express Managed Lanes, California



- **Other concepts** - Other tolling concepts such as *Shadow Tolling* deviate from the traditional tolling concept of user based fees. Under a Shadow Tolling arrangement, the facility operator receives all or part of the toll by a third party such as a sponsoring governmental entity. Shadow Tolls are based on how much traffic actually uses the facility. *Availability Payments* also follow a similar model in the sense that a public entity makes payments to a private entity which designs, builds, finances and maintains and operates a facility. The payments are determined based on the facility's availability and level of service achieved for operations and maintenance. Availability Payments are common for transit as well as highway projects. Since the costs for both Shadow Tolling and Availability Payments are not directly borne by the facility user, the policy considerations for such arrangements are different than those for traditional toll roads or managed lanes. For example, the tolling of a facility may cause users to divert to alternative free routes but the implementation of Shadow Tolling in the jurisdiction will not cause diversions.

II. Traffic and Revenue Studies

What are they? What do they accomplish? Why are they important? When are they used?

A traffic and revenue study is an analysis tool that evaluates the feasibility of tolling a candidate corridor or a set of corridors based on specific policy objectives. The policy objectives usually include one of two criteria - revenue generation or traffic demand management. These studies are used by policy makers to make long-term transportation decisions.

Figure 4: Electronic Tolling at the New Jersey Turnpike



A typical traffic and revenue study considers the following over the appropriate time horizon: tolling policy objectives, traffic forecasts and travel patterns along a corridor, potential toll revenue and operational profile of the corridor, cost of implementing toll operations, financing options and the impact of tolling on the corridor and surrounding area. Usually complex demand-evaluation models are used to determine these variables.

Depending on the level of detail considered, a traffic and revenue study may serve one or all of the following purposes:

- Presents an assessment of the viability of tolling a facility and expected toll revenue over a long-term time frame.
- Evaluates congestion relief potential and safety impacts of tolling options.

- Allows agencies to secure non-recourse debt for financing the constructing of a transportation facility.

Traffic and Revenue Study Tiers

Traffic and revenue (T&R) studies range from preliminary exploratory studies to detailed analysis. They are usually grouped into three levels which are illustrated in the table below. All four levels follow the same general process but increase in reliability from left to right.

	Exploratory Traffic and Revenue Study (Level I)	Concept Traffic and Revenue Study (Level II)	Investment Grade Traffic and Revenue Study (Level III)
Objective	A broad-brush/fatal flaw investigation into constructability and implementation opportunities. No financial questions are answered. This level of study provides evidence to support the expenditure of additional study funds.	Basic understanding of the forces of pricing along the study corridor and supporting and competing facilities. A general understanding of the magnitude of toll revenue stream and traffic composition. Understanding of the sensitivity of pricing.	Toll revenue financing and implementation vehicle.
Level of Analysis	Corridor	System	System
Data Collection	All data is garnered from existing sources	Major traffic and travel patterns and route reconnaissance supported by data from existing sources.	T&R + Origin-Destination (O-D) survey, stated preference survey, economic conditions and development/growth patterns and opportunities
Existing Conditions Assessment	Minimal/None – Whatever can be ascertained/ summarized from existing sources.	Thorough understanding of the existing traffic and travel conditions on the system (model+).	T&R + project specific understanding of traffic and travel conditions via data collection efforts + model.

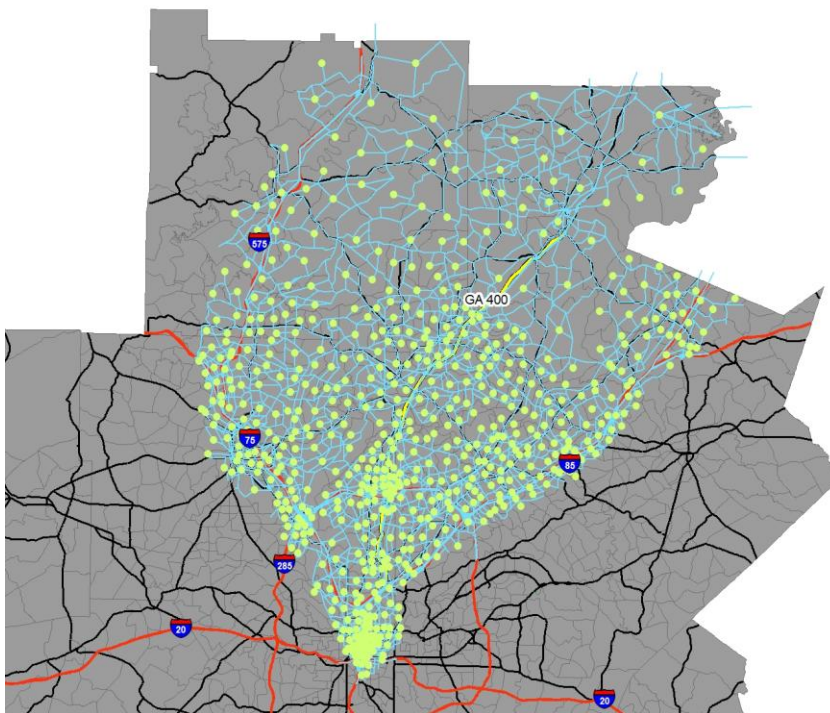
	Exploratory Traffic and Revenue Study (Level I)	Concept Traffic and Revenue Study (Level II)	Investment Grade Traffic and Revenue Study (Level III)
T & R Approach & Methodology	Back of the Napkin – Off model investigation based on traffic and travel conditions, travel times and the availability of competing routes.	Existing tools with minimal/moderate enhancements. Corridor level validation. More detailed look into mode and time of day.	Extensive modifications to existing tools. T&R + advanced diversion analysis, Value of Time estimates, Time of Day pricing, assessment, pricing.
Corridor Growth Assessment	Trend Analysis	Detailed investigation into population and employment growth and allocations over time. Analysis will be supplemented with analysis performed by others (MPO/RDC). Alternate outcomes will be generated to frame the sensitivity of pricing.	Independent evaluation of economic conditions and growth.
Toll Operations	Preliminary	Screening of potential tolling concepts and operational plans.	Implementation Plan – detailed costs, technology assessment and Operations. Plan
Level of Effort	\$50 - \$100k	\$500K – \$1.5m	\$2m+
Utility for Benchmarking PPI	None	Good	Excellent
Accuracy of Traffic and Revenue	Poor	Good	Excellent
Potential Use for Other Studies (EIS)	None	Applicable	Excellent
Additional Study Required for Implementation	Yes	Depends on potential financing mechanism.	No

	Exploratory Traffic and Revenue Study (Level I)	Concept Traffic and Revenue Study (Level II)	Investment Grade Traffic and Revenue Study (Level III)
Study Findings Summary and Limitations	Is the corridor a candidate for additional study of toll application?	Detailed T&R forecast and operational plan. Provides system level impacts and performance measures. Not for use in securing financing.	Study results are detailed enough to secure financing.

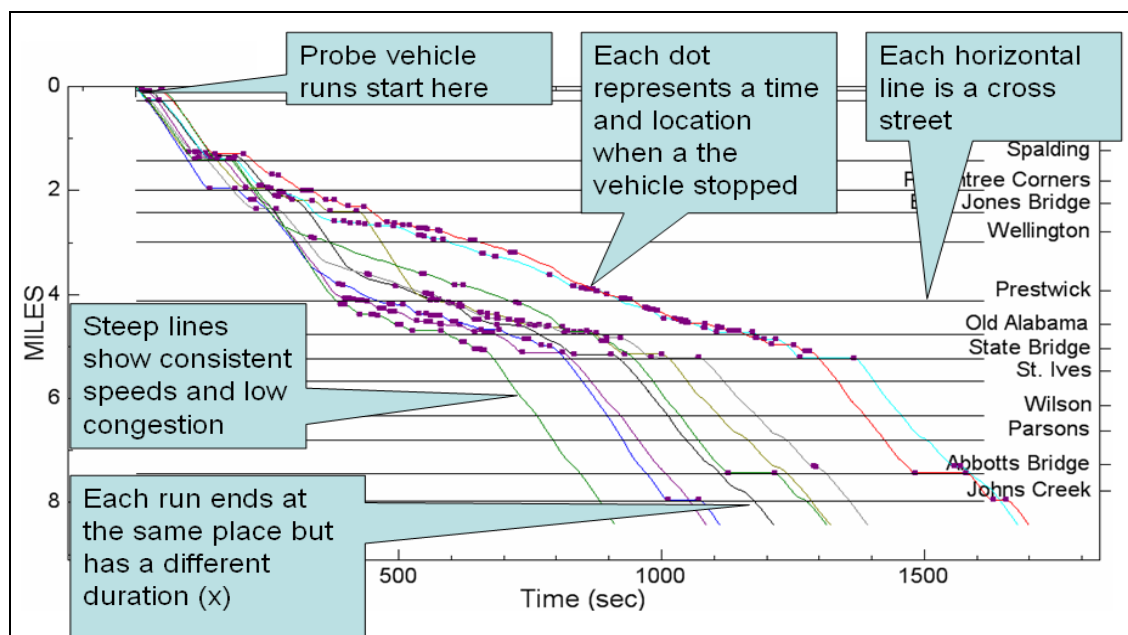
Data Collection and Analysis Tools

The key question in all traffic and revenue studies is the following – *“How much net revenue can be generated and over what period of time?”* Various types of data collection and analysis tools are used to answer this question. These tools generate an aggregate ‘profile’ of an area’s road users by providing information on their origin, destination, the number and type of trips they make in a typical day, and their receptivity towards tolling.

- **Traffic Counts and Projections** - Traffic volumes, either hourly or daily, are usually collected on the facility under consideration for tolling as well as alternate routes in the vicinity. However, the method of collection and the nature of counts varies by the tolling type under consideration. Traffic volumes are used as benchmarks to refine the travel demand models. These travel demand models are then used to project traffic trends for future years. Traffic counts usually distinguish by vehicle type and are performed manually for low volume corridors and mechanically for high volume corridors.
- **Origin and Destination Studies** - Origin and destination studies identify the beginning and ending point of the trip of the user of a given facility. An origin-destination study may be conducted by using travel demand modeling software or by collecting field data. Field studies collect license-plate data in either video or photograph format to identify which sections of a facility a given user utilizes. Surveying techniques are also used to determine origins and destinations of the users of a given facility.

Figure 5: Origin Destination Map

- **Traffic Analysis (micro simulation)** - A micro simulation model identifies changes in operational conditions and traffic volumes in the general purpose and tolled lanes on a corridor. A microsimulation model provides a greater level of detail than a regional demand based simulation model. It substantiates the broad-brush observations obtained from a macrosimulation model by providing detailed corridor level data. Specifically, microsimulation models help understand facility operations and traffic congestion related to highway features such as on/off ramps, lane drops, grades and interchanges, all of which are not well represented in a regional model.
- **Trip Patterns and Travel Times** - Travel time is the time taken to get from point A to point B on the corridor under study and is an indicator of the level of congestion on the corridor. Travel time is generated as an output of travel demand models and can also be collected using field data collection techniques. Field travel time data is collected by the following techniques: a) floating car method where a test-vehicle drives with the speed of other traffic on a corridor and records the travel time through an on-board GPS device; b) license plate matching method where license plates are matched at different points along the corridor.



Figure 6: Example of a Space Time Diagram illustrating Travel Time Data

- **Stated Preference Surveys** - Stated Preference (SP) surveys estimate users' willingness to pay tolls in exchange for improved transportation services. SP analysis is designed to provide behavioral values for use in modeling traffic and revenue impacts of alternative tolling scenarios. Survey techniques include questions in which travelers/users are asked about their willingness to pay for various trade-offs regarding expected travel times and variability. Mode choice models are estimated using the SP survey results and marginal rates of substitution between costs and travel times of alternatives are evaluated.

The primary outputs of SP assessment are usually values of travel time savings and possibly 'alternative-specific constants', which measures underlying bias towards a particular tolling scenario.

The application of SP techniques to toll road traffic and revenue forecasting is now widespread. SP surveys usually present respondents with hypothetical choices. One example is a question that asks users to choose between traveling for free, but at a slower rate, in the general lanes or paying a toll to use managed lanes and travel at free flow speed. Different levels of tolls and travel time difference between the general and managed lanes are presented to the survey respondent.

Figure 7: Example of a Stated Preference Survey Questionnaire

	<div style="font-size: 1.2em; font-weight: bold;">10101</div> <div style="text-align: center;">  Georgia Department of Transportation </div>
<p>The Georgia Department of Transportation and the State Road & Tollway Authority are conducting a survey to determine travel patterns along Georgia 400 to help future transportation planning efforts. Please answer the following questions and then drop this completed survey card in the mailbox. Postage is not required. Or, if you would like to reply to this survey online, please visit us at www.ga400survey.com. (Participation in this survey is voluntary.)</p> <p>In this survey, "<u>this trip</u>" is defined as travel only in the direction you were going when you received this survey card and does not include the return trip in the opposite direction.</p>	
1	Where did <u>this trip</u> begin? Please be as specific as possible. (address or nearest major intersection or landmark/major building) Address _____ City _____ Zip _____
2	At what time did you pass through the Georgia 400 Toll Plaza when you received this survey card? Enter time: ____ : ____ AM or PM (circle one)
3	Where did <u>this trip</u> end? Please be as specific as possible. (address or nearest major intersection or landmark/major building. This should be different from answer to question # 1) Address _____ City _____ Zip _____
4	What was the primary purpose of <u>this trip</u>? (select one) <input type="checkbox"/> To/from Work <input type="checkbox"/> Shopping <input type="checkbox"/> School <input type="checkbox"/> Business <input type="checkbox"/> Recreation <input type="checkbox"/> Other
5	How often do you make <u>this trip</u>? (select one) <input type="checkbox"/> 4 or more times per week <input type="checkbox"/> 1 to 3 times per month <input type="checkbox"/> 2 or 3 times per week <input type="checkbox"/> less than once per month but more than twice per year <input type="checkbox"/> once per week <input type="checkbox"/> twice per year or less
6	How many people, including the driver, were in the vehicle during <u>this trip</u>? (select one) <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4+
7	On the same day as <u>this trip</u>, did you also make the reverse trip (i.e., travel FROM the location you listed in question #3 TO the location you listed in question #1)? <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, what time did you make this opposite-direction trip? Enter time: ____ : ____ AM or PM (circle one)
8	What is your occupation? (select one) <input type="checkbox"/> Professional <input type="checkbox"/> Self Employed <input type="checkbox"/> Clerical <input type="checkbox"/> Retired <input type="checkbox"/> Retail <input type="checkbox"/> Teaching <input type="checkbox"/> Student <input type="checkbox"/> Other: _____
<p>Thank you!</p> <p>If you have any questions about this survey, contact David Spear, GDOT Office of Communications at (404) 657-6952 or leave a comment on the GDOT home page at www.dot.state.ga.us by clicking on the Contact Us link.</p>	

- **Value of Time** - The concept of time as a commodity that has a monetary value is based on two main premises:

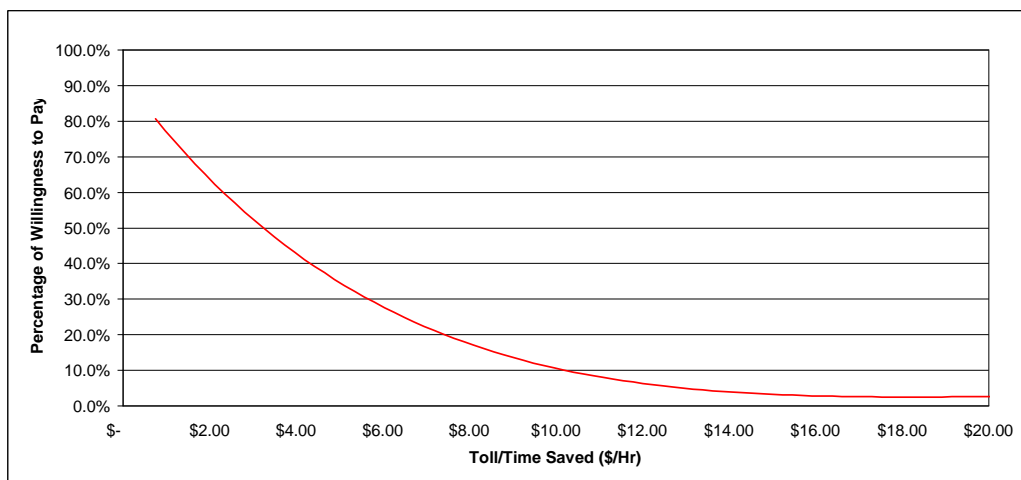
1. Time that is spent traveling can be used for other activities that provide a direct or indirect monetary benefit and can be viewed as travel time savings; and,
2. Benefits from travel time reduction if travel is associated with undesirable characteristics like congestion, stress, risk, etc.

Since benefits from travel time savings vary by choices made by commuters, literature suggests that value of time varies by characteristics of the trip itself (like transportation mode, trip purpose and trip length) as well as by characteristics of the commuter (like annual income).

Since tolls within a modeling framework are expressed as time costs, or time penalties, it is necessary to convert these costs into value of time information. Hence, value of time can be described as a user's willingness to pay to avoid alternate route congestion, measured in dollars per hours. Passenger cars and trucks have different values of time. Data collected for the Managed Lanes System Plan Study for Metro Atlanta noted a value of time for passenger cars between \$7-\$15 per hour and for trucks from \$10 for 2-axle trucks to \$28 for 6-axle trucks.

- **Willingness to Pay** - Willingness to pay estimates the amount that potential users of a tolled facility are ready to pay for the use of the facility and for the associated travel time savings. Users' willingness to pay is usually a function of their hourly wages, their value of time and the cost and quality of available competitive travel alternatives. Willingness to pay is usually one of the outputs of the Stated Preference Survey.

Figure 8: Willingness to Pay Curve



Typical Traffic and Revenue Parameters and Considerations

- **Time frame for T&R Estimates** - The time frame for traffic and revenue estimates is driven by the requirements of the financing and bonding agreements. The time frame may vary from 30-years to event 50 or 75-years and is largely determined by the nature of the debt instrument. However, 30 year traffic and revenue estimates are also commonly used.

- **Ramp Up** - Ramp up is used to describe the period between the time when the toll facility first opens and the time when the facility reaches a steady-state traffic condition. It accounts for the time it takes for users in the area to adjust their travel patterns and make a decision to either use the facility for their daily commute or not. Ramp up period may be a few months or several years.
- **Diversions** - Diversion estimates typically relate to corridor studies and estimate the number of travelers who choose a different path from a toll facility depending on the cost charged. Diversions are based on the economic concept of elasticity. Price elasticity of demand measures sensitivity of quantity of demand (travel time savings) to change in price (tolls). Thus, the measure used is the percentage of users retained for every percentage change in toll. If the elasticity is greater than 1.0, it implies that the demand is elastic i.e. a small increase in toll charges causes large diversions in traffic from the tolled facility. In contrast, if a large increase in toll causes a relatively small change in users on the tolled facility, the demand is inelastic.
- **Setting Toll Rates** - Toll rates are determined to be fixed for a facility or are varied depending on factors such as time-of-day or level of congestion in the priced lanes. Generally, toll rates vary by vehicle classification with heavy vehicles paying more than passenger cars. The revenues generated from the toll charges usually pay for the operations and maintenance of a facility along with debt retirement.

Usually, vehicles are charged a fixed toll rate based on number of axles. Vehicles can be charged either at one point or multiple points along a facility. A variation of this scenario is when tolls vary by time of the day, where the toll rate increases by a pre-set amount for use of the facility in peak periods. The main motivation for doing this is to push traffic demand from peak hours to other times of the day.

A further level of sophistication to time-of-day tolling is added by dynamic tolls. A dynamic toll, as characteristic of managed lane facilities, changes by the level of congestion in the priced lanes. For example, during peak periods, when general-purpose lanes are congested, more and more vehicles may opt to use the priced managed lanes. To ensure a guaranteed travel time in the managed lanes, the toll cost in these lanes will rise as demand rises. Dynamic tolls are usually assessed on a per-mile basis.

- **Toll Escalation Rates** - It is usually assumed that toll rates will be adjusted for inflation and growing demand over the lifetime of a tolled facility so as to maintain optimality for the tolling objectives. The precise nature and amount of the toll escalation is determined by a variety of factors such as whether the facility is a toll road or a managed lane, whether the facility is operated by a private authority or a public toll agency and existing political climate in the jurisdiction.
- **Risk Factors** – Traffic and revenue projections account for variations in values due to risk factors. Sensitivity analysis that considers variability in revenue due to variation in toll rates or variations in projected population and employment growth along the corridor are performed to generate a range of values. Furthermore, the financing plan incorporates contingency factors to account for risk.

III. Toll Financing

- **Gross Revenue** - Gross Revenue is the estimated toll collection in every year of tolled facility's timeline. From an analysis perspective, gross revenue is estimated for an average weekday using a travel demand forecasting tool. The common industry practice of calculating annual gross revenue involves multiplying the average weekday revenue by 250 weekdays per year and 115 holiday/ weekend days per year.
- **Net Revenue** - Net Revenue is a measure of net financial revenue during the years that potential bonds are outstanding, which is based on the gross revenue in the year of opening, less operating and maintenance costs and less a deduction for a traffic "ramp-up" period during which public acceptance is developing. Net revenues are those available for debt service payments.

To compute the net revenue, several sets of costs are deducted from the gross annual revenue. These deductions include:

- Toll Equipment Costs
 - Toll Equipment Maintenance Costs
 - Transaction Processing Costs
 - Maintenance Staff
 - Billing and Customer Service Staff/Cost
 - Bridge and Roadway Maintenance Costs
- **Net Present Value** - Net Present Value (NPV) is equal to the present year value of an investment's future net revenue less the initial investment. For example, in terms of a concession agreement, the private party would use a discount rate to translate the total future annual concession to present value.
- **Time Financing (Toll Revenue Bonds, TIFIA Loans)** - Time Financing is a funding source that leverages the long-term equity of an infrastructure investment. A toll revenue bond is a type of municipal bond that is used to procure capital funds for the construction of a facility. The bonds are repaid through the toll revenue generated by the tolled facility. Thus, robust toll and revenue estimates are critical to avoid any defaults on the bond repayment. Transportation Infrastructure Financing and Innovation Act (TIFIA) loans provide credit assistance to projects of national or regional significance in form of direct loans, loan guarantees and standby lines of credit, which are a type of contingency fund that can be drawn upon the first 10 years of project operations.

IV. Tolling Policy

- **Toll Rates** - The toll rate for a facility can be a flat-rate or variable-rate, variable tolls on exclusive facilities (express toll lanes), and variable tolls on exclusive HOV facilities (HOT lanes). The ideal toll rate policy balances revenue generation with equity and public acceptance issues.

Figure 9: Toll Rates by Vehicle Type

A photograph of a green highway toll sign mounted on a metal pole. The sign is rectangular with rounded corners and contains white text. The word 'TOLL' is at the top right. Below it, there is a table with two columns: vehicle type and toll amount. The vehicle types are listed as 2 AXLE, 3 AXLE, 4 AXLE, 5 AXLE, and 6 AXLE. The corresponding toll amounts are \$0.30, \$0.50, \$0.75, \$1.30, and \$1.60 respectively. The background of the sign is green, and the text is white. The sign is set against a clear blue sky.

	TOLL
2 AXLE	\$0.30
3 AXLE	\$0.50
4 AXLE	\$0.75
5 AXLE	\$1.30
6 AXLE	\$1.60

- **Demand Management** - The management of traffic demand can be optimally achieved by a variable toll policy. This will require solutions such as managed lanes to be implemented.

Figure 10: Demand Management on SR 91, California



- **Eligibility** – An eligibility policy describes the kind of vehicles that can use a tolled or managed lane and the toll rate that each type of vehicle has to pay. One form of eligibility is occupancy policy which distinguishes between vehicles that can travel for free or for a discounted charge in a tolled lane versus those which have to pay the full toll charge. For example, a HOV2+ toll policy will discount the toll charged for all vehicles with two or more occupants. This policy centers on encouraging user-based travel demand management such as carpooling. The occupancy policy usually also accounts for transit vehicles. Another form of eligibility is lane usage by vehicle type. For example, managed lanes may be open to passenger vehicles and may exclude usage by heavy trucks. However, based on congestion levels, trucks may be permitted to use the managed lanes during off-peak hours. Similarly, a truck only toll lane would exclude all passenger vehicles and be open to heavy trucks only.

Figure 11: North Texas Tollway Authority Toll Plaza



- **Mandatory vs. Voluntary** - Toll policy can dictate mandatory or voluntary use of toll lanes. Mandatory usage toll policy is likely to face public resistance but generate higher toll revenues. Voluntary usage toll policy is considered more equitable and market-oriented.
- **Converting existing free lanes** - Policies that take away existing free lanes, such as conversion of a HOV lane to a HOT lane which was mainstreamed by SAFETEA-LU. However, this policy can provide a greater return on investment and may be a viable alternative where sufficient up-front capital costs are not available.